TO WHOM IT MAY CONCERN:

BE IT KNOW THAT WE, RONALD T. BUTLER, a citizen of the United States of America, residing in Santa Barbara, in the County of Santa Barbara, State of California, and ALAN GEORGEFF, a citizen of the United States of America, residing in Newbury Park, in the County of Ventura, State of California, have invented a new and useful improvement in

GAUGING APPARATUS AND METHOD

BACKGROUND OF THE INVENTION

This invention relates generally to accurate selection and installation of vehicle wheels and tires, and more specifically concerns provision of apparatus and methods to achieve such selection and installation, rapidly and accurately.

In the past, vehicle tires, installed on metallic wheels, were selected by visually estimating the sizes of tires and wheels to be installed. Generally this required installation of a series of wheels and tires, until a satisfactory fit of a wheel and tire to the vehicle wheel well space was achieved. Such procedures were inefficient, time consuming and required time and labor to mount several wheels, with different tires until the desired result was achieved. The problems included interference, or potential interferance, of oversize tires with fenders and fender edges, particularly during wheel turning, and interference with vehicle structure, such as struts, shock absorbers, tie rods, and other vehicle equipment facing the wheel well. The problems became acute when it was desired to install wide or larger size tires as on racing vehicles. No way was known to achieve the highly advantageous results and methods of wheel and

tire size selection, as are now provided by the present invention.

SUMMARY OF THE INVENTION

It is a major object of the invention to provide apparatus and method to overcome the above referenced problems and difficulties. Basically, the apparatus of the invention includes provision of a multiple gauge assembly for establishing vehicle wheel rim and tire sizes to prevent interference with vehicle structure facing the wheel, as during directional turning of the wheel on a vehicle wheel mount, about a pivot axis normal to the wheel axis, comprises in combination:

a) a first adjustable gauge to establish a rim edge radial dimension, from that wheel axis,

b) a second adjustable gauge to establish a rim offset or back spacing dimension in a direction generally parallel to the wheel axis,

c) and a third adjustable gauge to establish a tire peripheral dimension generally parallel to said wheel axis,

d) whereby clearance between the wheel and

said vehicle structure can be predictively ascertained, as by gauge assembly manipulation, prior to installation of the wheel on the mount.

It is another object of the invention to provide the first gauge which is elongated in a first direction, second gauge elongation in a second direction, such first and second directions being mutually substantially perpendicular. The third gauge is typically elongated in a third direction substantially parallel to said second direction.

A further object is to provide for the assembly to include a first carrier supporting the first gauge for linear adjustable movement in said first direction, and a second carrier supporting the second gauge for linear adjustable movement in second direction. In this regard, the assembly may include a third carrier supporting the third gauge for linear adjustable movement in a third direction relative to the wheel axis. Further, the second direction is typically substantially perpendicular to the first direction, and the third direction is substantially parallel to said second direction.

Yet another object is to provide a gauge assembly in which the first, second and third gauges have sliding interconnection, with said first, second and third carriers, respectively.

An additional object is to provide a connector plate carrying the gauge assembly, and configured for bolt-on connection to the vehicle wheel mount. In this regard, the multiple carriers are rigidly carried by that connector plate, to project in directions accommodating shifting of three gauge sliders, and pivoting of all three shifted sliders with the wheel mount, to determine the existence and extents of gauge assembly clearance with respect to vehicle structure facing the wheel well, all prior to any need for wheel and tire mounting or installation to the wheel mount. The sliders may be shifted to assure sufficient clearances, and satisfactory wheel and tire sizes may then be rapidly and accurately determined from the shifted gauge slider positions.

The basic method of the invention includes provision of a gauge assembly, as referred to, its installation on a vehicle wheel mount, gauge slider shifting to assure clearances as referred to, and readout of gauge slider positions.

These and other objects and advantages of the invention, as well as the details of an illustrative embodiment, will be more fully understood from the following specification and drawings, in which:

DRAWING DESCRIPTION

Fig. 1 is a frontal elevation of a multiple gauge assembly incorporating the invention;

Fig. 1a is an enlarged section taken on lines 1a-1a of Fig. 1;

Fig. 2 is a rear elevation of the assembly of Fig. 1;

Fig. 2a is a side elevation taken on lines 2a-2a of Fig. 2;

Fig. 3 is a perspective view of one form of adapter plate used to connect the Fig. 1 assembly to a vehicle wheel mount;

Fig. 4 is a view like Fig. 3, showing another form of adapter plate;

Fig. 5 is a perspective view showing installation of the adapter plate and gauge assembly onto a vehicle wheel mount, in a vehicle wheel well; and

Fig. 6 is a schematic view showing correspondence between gauge settings and a vehicle wheel and tire, to be installed in mounted condition.

DETAILED DESCRIPTION

In the drawings, a preferred multiple gauge assembly is shown at 10 for establishing vehicle wheel rim and tire sizes to prevent interference with vehicle structure facing the wheel, as during directional turning of the wheel on a vehicle wheel mount, about a pivot axis 11 angled relative to the wheel axis 12. See pivot structure 11a in Fig. 5. The assembly includes:

a) a first adjustable gauge 13 to establish a rim edge radial dimension 14, from the wheel and wheel mount axis 12,

b) a second adjustable gauge 15 to establish a rim offset (back spacing) dimension 16, relative to wheel mount 50, in a direction 17 generally parallel to the wheel axis,

c) and a third adjustable gauge 18 to establish a tire peripheral radial dimension 19 relative to, and generally parallel to the wheel axis 12,

d) whereby clearance between the wheel and said potentially interfering vehicle structure can be predictively ascertained, as during said wheel turning, prior to installation of the wheel on the mount.

Such vehicle structure may include the curved or projecting rim 20 of a vehicle fender 21 facing the wheel well, and structure 22 such as a shock absorber or absorbers 23, and/or a strut or struts or a tie rod or tie rods 24.

As shown, and with regard to the installed assembly, the first gauge 13 is elongated in a first direction 23 extending away from axis 12, and the second gauge 15 is elongated in a second direction indicated at 17, generally parallel to axis 12, said first and second directions being mutually perpendicular, or substantially perpendicular. The third gauge 18 is elongated in a third direction seen at 25, which is substantially parallel to second direction 17.

The assembly includes a first carrier 26 supporting the first gauge 13 for linear adjustable movement in direction or directions 23, and a second and transverse carrier 27 supporting the second gauge 15 for linear adjustable movement in a second direction 24. Carrier 26 is carried by mount 50 and carrier 27 is or may be carried by gauge 13, as shown. The assembly may also include a third carrier 28 carried by 14 and supporting the third gauge 18 for linear adjustable movement in third direction or directions 35. Carrier 28 is supported by vertical slide 38,

slidable in a carrier 39 attached to 26, but not to 27. The carriers may be elongated as shown, and have like sides 30, 31 and 32, gauge edge guides 33, 34 and 35, and set screws 60 to clamp edge guides, and that may be loosened to allow gauge adjustment and tightening, to fix the gauges in selected positions. The carriers are operatively interconnected.

Note that the second direction is substantially perpendicular to said first direction, and the third direction is substantially parallel to said second direction; and the first, second and third gauges have sliding interconnection with the first, second and third carriers, respectively. The gauges have indicia thereon, as at 40, 41 and 42, that indicates dimensions corresponding to vehicle wheel and tire radial, rim offset (back spacing), and tire dimensions indicated at 44, 45 and 46 relatively, as in Fig. 6.

A connector plate 50 carries said assembly 10, and is configured for bolt-on connection to the vehicle wheel, hub or mount 51. Hub 51 is turnable with the mounted (selected) wheel 52, about axis 12. Mount 51 is also turnable with the wheel (by steering) about pivot axis 11 normal to axis 12.

Bolts 60 project from hub or mount 51 for attachment to the wheel 52, or to the connector plate 50.

Fig. 3 shows connector plate 50, with openings 50' to pass bolts 60; and Fig. 4 shows an alternate plate 50a, with openings 50a' to pass bolts. A lug 62 projects from the plate.

Indicia on the gauges or sliders register with edges 51-53 to indicate measurements.